A STUDY OF PORTFOLIO ATTRIBUTION AND HOLDINGS BASED ANALYSIS OF MUTUAL FUNDS IN INDIA

1. INTRODUCTION

Mutual Funds have become an important tool for mobilizing the savings of individuals and institutions. Over the past decades, the mutual fund industry has seen immense growth and has become a significant player in the Indian capital market. The AUM of India's mutual fund industry has shown two fold growth from Rs. 19.97 trillion in July 31, 2017 to Rs. 37.75 trillion in July 31, 2022 in a span of five years. The total number of accounts or folios under equity, hybrid and solution oriented schemes as on July 2022 stood at 135.6 million, wherein the maximum investment is from retail segment which stood at about Rs.108 million (www.amfiindia.com/indian-mutual). Though India's mutual fund AUM to gross domestic product (GDP) ratio is just 15 percent against the global average of 75 percent, the country's mutual fund industry has the potential to grow exponentially.

The performance of mutual funds has been a widely debated topic right from the introduction of Jensen model of mutual fund performance in 1964. This subject is extremely relevant to the investing community, both retail and institutional, as the investment decisions and strategies are mainly guided by the funds' historical performance. Performance analysis of the funds is equally helpful for mutual fund managers as this can be utilized as a barometer for the managers' decision making ability. This is because, the profitability of any fund is directly linked to the decision making capacity of fund managers, right from portfolio construction to portfolio revision, market timing ability, and so on. Further, this topic is relevant to the research community and academicians as various time-tested performance models can be developed and evaluated for the benefit of investors, mutual fund companies and others. Ultimately, information on the mutual fund performance is highly essential for the regulating agencies like central bank, mutual fund regulators, stock exchanges, stock market regulators, insurance regulators, etc.

This study focuses on the performance of Indian mutual funds concentrating on the equity mutual funds. In comparison to other studies conducted in India on mutual

fund performance, this study is significantly different. Firstly, this study analyzes all equity funds covering the time period from their inception till December 2020 for portfolio attribution analysis. Holdings based analysis studies the industry from 2012 to 2020. This time frame is critical in the context of the Indian capital market. During the initial years of the study period, the global stock market was still recuperating from the 2008 financial crisis. Following a decline due to the financial crisis, the influx of foreign funds into the Indian mutual fund industry gradually resumed. In the mid of this decade 2011-2020, there were significant political changes that took place in Indian politics. The implementation of new programs and initiatives, including the Goods and Services Tax (GST), demonetization, privatization of the government-owned businesses, raising the cap on foreign investment in certain industries and many more affected a number of economic sectors, including mutual funds, directly and indirectly. Above all, towards the end of the decade the world experienced a heavy blow when the SARS-COV-2 virus spread over the world and caused a deadly pandemic. Emerging countries like India were compelled to endure the death blow from the virus due to its severe impact on millions of people and businesses. All the above mentioned events significantly impacted the Indian economy and so did the mutual fund industry. Thus,the time period chosen for this study is therefore quite pertinent.

The present study is organized as follows, chapter one deals with the introduction to the mutual fund industry, chapter two deals with the literature review, chapter three deals with research methodology, chapter four performance evaluation measures, while analysis and results are discussed in chapter five, chapter six concludes with findings, suggestions and research implications.

2. REVIEW OF LITERATURE

The mean variance framework for constructing efficient portfolios of Markowitz (1952) led to the development of the capital asset pricing models (CAPM) of Sharpe (1966), Lintner (1965) and Mossin (1966). These significant contributions paved the way for the development of various portfolio/mutual fund performance measurement methods. Treynor (1965), Sharpe (1966), and Jensen (1968) are the pioneers in the

portfolio/mutual fund performance analysis. These CAPM based measures are categorized as return-based traditional models of portfolio analysis.

Jensen (1968) examined the selectivity ability of 115 mutual funds with an alpha indicator . He found that mutual fund managers failed in proper stock selection. Treynor and Mazuy (1966) (henceforth TM model) established a quadratic regression method in order to measure the market timing ability of fund managers. Out of a sample of 57 open-end funds, only one fund demonstrated significant market timing ability. Subsequently, many studies were conducted using the TM model. Fama (1972) categorized the overall performance of mutual funds into 'macro forecasting' or 'market timing' and 'micro forecasting' or 'stock selection'. Since then, it is common practice to divide the portfolio performance into two components, stock selection and market timing. These initial efforts of Sharpe (1966), Treynor and Mazuy (1968), Jensen (1967, 1968) on mutual fund performance laid the foundation to a series of studies in the areas of market timing and stock selection skills of fund managers. The subsequent studies either extended the pioneer models or deviated from them. Majority of studies were concentrated on the US markets. However, a good number of studies are conducted in developed economies of Europe and Asia. Off late, the researchers of emerging economies too are focusing on the issue of mutual fund performance.

Some of the significant studies in the US include Merton (1981), Henriksson and Merton (1984), Grant (1977), Kon and Jen (1978, 1979), Kon (1983), Bhattacharya and Pfleiderer (1983), Jagannathan and Korajczyk (1986), Lee and Rahman (1990), Coggin et al. (1993) Kao et al. (1998) Bollen and Busse (2001) and Chen et al. (2010). Merton (1981) developed a non-parametric framework for examining the market forecasting ability wherein the knowledge of distribution of stock or market returns is not essential. Applying this model, Henriksson and Merton (1984) (hereafter HM model) investigated 116 mutual funds along with a parametric model and found that there is absence of significant marketing timing skill among the fund managers. Grant (1977) segmented the risk or the variance of return in order to demonstrate a 'potential cost of timing' decisions. He argued that the Jensen (1968)

alpha measure will be downward biased if the performance measure focuses only on micro forecasting or security selection skills.

Kon and Jen (1979) proposed a switching regression methodology for measuring the market timing performance which includes the non-stationary risk level of funds. Kon (1983) extended this methodology and argued that, this methodology avoids the downward bias of the least square model of Jensen (1968). The extended model was applied on 37 mutual funds having monthly data. It was found that the sample funds did not show any timing ability. Considering Fama (1972) and Jensen (1972) as base models, Chang and Lewellen (1984) addressed the issue of stationary portfolio risk levels which permits a more 'complete appraisal' of the factors of performance. Neither skillful market timing nor clever security selection abilities were evident in the sample funds. Jagannathan and Korajczyk (1986) demonstrated that with the parametric techniques of market timing and stock selectivity like the HM model can show spurious results when applied to option-like securities. They argued that, when the market portfolio or benchmark index contains option-like (risky) securities, portfolios with greater concentration of option-like securities will show positive timing performance and vice versa.

Lee and Rahman (1990) argued that the conventional performance models fail to separate the aggressiveness of a fund manager from the quality of the information he possesses. They applied the modified TM model developed by Bhattacharya and Pfleiderer (1983) on a sample of 93 US mutual funds. This study reported that there was some evidence of greater forecasting ability among fund managers. Coggins et al. (1993) employed both the TM model and Bhattacharya and Pfleiderer (1983) models on the monthly returns of 71 US equity pension funds. In addition, this study considered the heteroscedastic disturbance terms. They found that regardless of the choice of benchmark index portfolio or estimation model, the selectivity coefficient is positive and timing measure is negative. Further, this study found some evidence that the selectivity and timing are sensitive to the choice of benchmark index.

As far as international mutual funds is concerned, Kao et al (1998) applied the Merton (1981) and HM model on 97 US based international funds. It is found that the

international fund managers are poor market timers. Romacho and Cortez (2006) observed a distance effect on stock selection performance. That is, fund managers who invest in domestic funds perform better than those who invest in international markets. However, the domestic fund managers show poor market timing skill when compared to international fund managers.

Bollen and Busse (2001) for the first time considered the daily return frequency to analyze the mutual fund performance. Further, this study compared the result of daily returns with the monthly returns to see whether the daily data changes inference regarding timing ability of the fund managers. It was concluded in this study that using daily data is more powerful than the low frequency data.

As far as the Indian mutual fund managers are concerned, Deb et al. (2007) applied an unconditional and conditional TM model and HM model for the monthly and weekly data. It was revealed from this study, that like many of the US based and other studies, Indian managers are poor market timers. Chopra et al (2011) studies 37 diversified equity funds by employing the Jensen (1968) and HM model. In line with Deb et al (2007) this study also concluded that there is no stock selection and market timing skill among fund managers. Based on conditional and unconditional TM and HM models, Dhar and Mondal (2014) found that out of 80 sample funds only six funds exhibit market timing ability. Absence of market timing is found even after including a control variable for the public information. Agarwal and Pradhan (2018) applied a multifactor version of TM and HM models. Deviating from most of the Indian and foreign study results, this study found that Indian mutual fund managers possess significant stock selection ability and they also exhibit significant timing skills when monthly return frequencies are used. **Alam and Ansari (2020)** examined the timing skills of Indian fund managers for a sample of 183 equity funds for the period 2000 to 2018 and found no evidence of market return timing skills and volatility timing skills among fund managers. **Suvarna.A (2022)** uses the conditional TM and HM model to examine the selection and timing skills of fund managers and found that less than 25 percent of the funds in the sample display the managerial skills as per TM model and only 6 percent as per the HM model which means that fund managers are poorly skilled in attaining the stock selection and market timing skills.

However, the question of whether there is a possibility of attaining consistency in stock selection and market timing among Indian mutual funds is the area to be focused.

The above literature review reveals that the majority of the empirical studies on market timing and stock selection ability of the fund managers do not show significant timing and selection skills. These results are evident in the studies conducted in the developed economies as well as a few emerging economies. In addition, these results are persistent across the models, data sets, data frequency and the benchmark market portfolios. However, number of studies in the emerging economies are slant, and those existing studies suffer from a few drawbacks. First, only a limited number of mutual funds are considered for the timing and selection ability. Therefore, the results of these studies cannot be generalized. Second, except Agarwal and Pradhan (2018), other studies have not considered the problems of using time series in any regression model. The factors like autocorrelation, serial correlation, heteroscedasticity in the residuals are not given any importance in the studies conducted in the emerging economies like India. Therefore, this study intends to fill the gap in the existing literature by inclusion of adjustments for time series problems. We compare the results of timing and selectivity before inclusion of adjustments for these properties and after. In addition, this study includes all the equity mutual funds that are operating in India from their inception i.e from 1993 to 2020. Hence, this study is significant in terms of the number of mutual funds included for the study, and therefore the results are more robust.

3. PROBLEM STATEMENT

The fund's performance is measured in terms of its returns. The return in excess of their chosen benchmark may either be due to the ability of the fund manager to select the growing industries or his ability to time the market or the ability to effectively allocate the assets of the portfolio to the right stocks. Portfolio attribution interprets how well the portfolio managers have performed in the market and also measure the extent of value added to their portfolio. In order to determine whether fund managers are actually enhancing the value and outperforming the market, funds are evaluated based on skills of stock picking, market timing and asset

allocation i.e, an attribution analysis is done. Performance of mutual funds are attributable to fund manager's skills in picking superior stocks, ability in timing the market and their allocation decisions. The study analyses the fund's portfolio using the above three performance drivers which is termed as portfolio attribution analysis. The asset allocation of the mutual funds are further analysed based on their holdings. Holdings based analysis studies the trend in the mutual fund holdings in various sectors and companies. A comparison of the fund returns against their sector breakdown may indicate that the fund is in line or reveal any over or under allocations to any specific sector leading to positive or negative returns. The key to this study is to identify if there is tendency of under or over allocations by the fund managers by considering the historical as well as the current data.

Keeping this in mind, the following objectives are set.

4. OBJECTIVES OF THE STUDY

1. To ascertain the performance of equity diversified categories of mutual funds in India.
2. To investigate whether active management adds more value to superior stock selection and market timing.
3. To study the sectoral allocation of the equity diversified mutual fund schemes.
4. To study the trend in the movement of top holdings of the equity funds.

5. HYPOTHESES OF THE STUDY

Based on the objectives, the hypotheses are framed with the research questions. The main question is whether the fund managers are found with superior stock picking ability is one of the issues which is still an ongoing debate. There is some evidence of underperformance of average returns claimed by mutual fund portfolios (Sharpe(1966), Jensen (1968), Gruber (1996), Carhart (1997)). Some argue that there do exist superior stock picking ability among fund managers (Grinblatt and Titman (1993), Wermers (2000)). However, the stock picking skills involves high costs but shows slightly better performance compared to their benchmarks.

In most of the papers, one of the major drawback of the methodologies showing

the existence of stock selection skills is that they have used backward looking approach i.e., they attributed good performance of funds in the past for the existence of superior skills. To investigate more on the above statement, the next hypothesis is set.

So the null hypothesis is set as,

H01: The fund managers do not show superior stock picking skills.

Most of the studies have found little or no evidence of market timing over a period of time (Treynor and Mazuy (1966), Henriksson and Merton (1981) , Henriksson (1984), Chang and Lewellen (1984), Gupta (2001), Comer (2006), Choudhary and Chawla (2012)). Some studies found managers with timing activities but it was done in the wrong direction resulting in fund managers lacking market timing skills (Nalini (2006)).

However the studies found it difficult to examine whether the fund managers create value through market timing. Thus, the study sheds light on this research question by offering new empirical methodology considering the various pitfalls. The studies ignored the potential importance of volatility on timing, whereas it plays an important role in investment decisions. However, few studies say that volatility timing will fetch better performance than timing the returns. To study the way managers react to market volatility, we formulate the next hypothesis:

H02: Active managers with varying timing abilities do not lead to better performance.

A subsequent number of studies that focused on performance along with market timing, found no evidence for timing (Grinblatt, et al (1997); Wermers (2000); Kacperczyk, et al (2005); Kosowski, et al (2006); Kacperczyk and Seru (2007). The study focus on the impact of stock selection and market timing abilities of managers on mutual fund performance. So the above two hypotheses will analyse the portfolio attribution of fund managers based on the stock selection and market timing skills.

Very few studies have examined the asset allocation decisions as the most important determinant of a fund's performance. So, the study assesses the trend of fund holdings in different sectors over the period of time. So the next hypothesis is

H03: There is no significant effect of change in sector holdings among the asset

class of mutual funds over the time period.

There is no study on the affect of asset allocation and reallocation of mutual funds on their performance.

Holding-based studies employed pooled statistics but could not adjust for the cross-sectional correlation in funds' weights which is particularly important for testing timing (Kosowski, et al (2006)).

In addition to the above hypothesis, how often the fund manager should change the portfolio holdings to frame optimum portfolio is the area to be focused on. The studies examined fund managers' ability to select stocks and time the market whereas their ability in changing their top holdings of the funds is not given much importance. This study covers the above research gap and checks if it leads to better performance. Hence the null hypothesis is framed that,

H04: Changes in top holdings of mutual funds do not lead to better performance.

The above hypotheses mainly concentrate on the study of portfolio holdings, asset allocation, sector allocation, risk and return analysis, stock selection and market timing which predicts the fund managers' performance.

6. RESEARCH METHODOLOGY

Data: The secondary data related to the mutual fund schemes and their asset class is being collected through the fact sheets and fund reports of various funds given by different Asset Management Companies, RBI Bulletin, Website of AMFI, BSE and SEBI. The schemes which have complete data set available for the period of study will be considered for the study. These schemes have invested their percentage of corpus in both regular and direct option from growth and dividend plans under twelve equity diversified categories such as large capitalisation, mid capitalisation, small capitalisation investment styles are considered.

Our sample period is from 1993 to 2020 because most of the funds have their data set from 1993. Over our sample period, there were 1378 fund schemes in the initial sample, which included the defunct funds. The study includes the funds based on the investment policy. So, the closed-end funds, fixed-income funds and funds which changed their policy over the study period are excluded. Subsequently, our

sample size was narrowed down to 1255 funds. Funds with a specific policy such as guaranteed funds, index funds, international funds which exhibit difference in risk exposure and also different benchmarks are excluded to measure the performance.

To analyse fund performance, daily data of Net Asset Value (NAV) for all the equity oriented schemes which cover 1378 schemes from 39 asset management companies (AMCs) companies under the AMFI website has been used for the study. However, due to data unavailability as per our requirements, the number of schemes analysed is restricted to 1255 schemes. Out of 40 AMCs, Yes Asset Management company is not considered as the equity funds are not available for the study. To analyse the fund's capacity to beat the benchmark, market data from BSE SENSEX and risk free data from 91 days Treasury bill rates which are collected from the data library for Indian market. The risk-free rate of return is due to an investment with zero risk over a specified period of time. The AMFI provides daily net asset values (NAVs) which are then calculated to get the daily mutual fund returns. This study employs daily data in the analysis, unlike many other studies where yearly, monthly or weekly returns are considered to examine performance. Using daily data can increase the precision of the study considering the strategies employed by the fund managers. Thus, it will increase the robustness of the results and uses financial time-series to estimate the risk-adjusted performance.

Holdings data for the study is collected from the handbook of statistics under SEBI for the research which includes equity sector allocation of mutual funds.The study covers the period from year of data availability in SEBI i.e.monthly data from 2012 to December 2020. This period covers the periods of boom, stagnation and slowdown in the Indian economy due to various factors. Therefore, this period tests the fund manager skills to prove their capabilities in such economic scenarios and the importance of sector allocation and asset formations in changing macroeconomic environment. The company holdings which are collected from websites of respective asset management companies are also studied. The schemes with less than one year fund age are not considered for the study. Changes in company holdings is analysed for top five sectors based on AUM for a period of five years to identify the trend in fund movement.

Methodology: To attain the objectives, the study highlights different methodologies developed by Sharpe (1964), Treynor(1965), Treynor and Mazuy (1966), Jensen (1968), Fama (1972), Henrikkson and Merton(1981) and (1984) to evaluate the performance of funds. The model which evaluates the selectivity skills of fund managers and also measures the market timing for the portfolio is used for attribution analysis. As the fund managers' skills are studied based on their past performance, the present research attempts to study the stock selection and market timing ability of fund managers using Treynor-Mazuy model(TM) and Henrikkson-Merton(HM) model with an assumption that market timing can be analysed using risk and return relationship, keeping other variables constant. Thus, a methodology to measure the portfolio attribution for the study is the "TM and HM" models. The data are to be empirically tested using hypotheses and econometric models employing statistical software packages namely, Excel and EViews. The model is tested for their statistical adequacy. Once the data satisfies the model adequacy, the results thus obtained are interpreted in relation to the theory and prior empirical evidence. Finally, conclusion is drawn and suggestions are offered for future research.

The unconditional models are used for measuring performance, stock selection ability and market timing of fund portfolios. Cross-section/ time-series regression methodology will be used to examine the relation between the funds' risk and return. The application of quantitative methods to finance which involves econometric methods such as ARCH and GARCH specification is used. To understand how the fund managers react to the changes in the market, conditional market volatility with a GARCH specification is measured. It is employed to clearly differentiate the active managers with varying ability which leads to better asset allocation decisions.

Also the frequency with which fund managers buy and sell securities from various sectors is one of many factors that needs consideration when evaluating a fund. This portfolio turnover rate is an indicator of how often a fund's manager trades securities. Mutual funds become costly when there is churning of portfolios involving high transaction costs. However, portfolio churning balances risk and

return during changes in the market conditions. This study looks into these changes in selected sectors and their impact on fund's performance. The holdings based analysis involves the churning of a portfolio over the study period. The changes in sector holdings and company holdings over the period is studied and the significant relationship between the sectors and among the sectors is examined using simple analysis of variance(ANOVA) technique. The growth rate of holdings is studied using CAGR(Compounded Annual Growth Rate) in order to study the effect of sector holdings on mutual fund performance.

7.SCOPE OF STUDY

The study is conducted for all actively managed equity mutual funds for which data is available for more than a year and will be focused more on open category schemes. The equity funds are taken for the study because it has highest churning compared to other categories. All the funds under different equity categories are considered and the study will be based on the data which is collected since their inception and analyzed using models accordingly. Out of 40 AMCs, 39 AMCs are considered for the study. Yes AMC is not included as the data is not suitable for the analysis. However, the study concentrates only on the performance of funds, stock selection, market timing, its holdings and sector allocation of the equity mutual funds. The study highlights the changes in holdings which can be studied well for the actively managed funds. So, our study includes the analysis of equity holdings of various sectors which have shown the movement for the study period. The study for portfolio attribution include the funds from their period of inception and the holdings based analysis includes the holdings data based on their availability.

8. MODELS FOR EVALUATION

Investors invest with an expectation of earning higher returns at a minimum risk. Investment decisions of the investors are based on the fund managers ability. There are a large number of mutual fund schemes operating in the Indian financial market under forty asset management companies. For our study, 39 mutual fund companies operating with 1255 schemes including options are included to meet investors needs and services (Based on AMFI report). Therefore, investors would find it difficult to

select appropriate scheme from a large number of mutual fund schemes due to the insufficient knowledge and lack of skills. The efficiency of the fund managers relating to their attributes is assessed. Treynor-Mazuy model and Henrikkson - Merton model are used to evaluate the investment performance based on stock selection and market timing skills. The robustness is checked using ARCH and GARCH model to give us accurate results for the study.

Treynor and Mazuy (1966) extended Jensen's (1965) single index model by including a quadratic term in the basic alpha model. According to the TM model, portfolio returns are a nonlinear function of market returns. If the portfolio managers exhibit market timing skills, they increase investment in high beta stocks in anticipation of price rise in near future. Similarly, when a market rally is predicted, funds will be shifted to safer, low beta securities. Therefore, as per the TM model, the security market line (SML) will curvature if market timing exists. The quadratic form of the TM model can be expressed as follows,

$$R_{it} - R_{ft} = \alpha_{it} + \beta_{it}(R_{mt} - R_{ft}) + \gamma_{it}(R_{mt} - R_{ft})^2 + \varepsilon_{it} \text{ ---------- 1}$$

Henriksson and Merton (1981) proposed a different approach to market timing. They argue that the market timer allocates capital between risk-free assets and equities based on future excess market returns estimates. Market timer has to estimate the excess market return over the risk-free return. If the market return is equal to or greater than the risk-free return it is termed as an up (bull) market. In such cases, the market timer would select high beta securities. If the market return is less than the risk-free return, it is called a down (bear) market and he would choose low beta securities. As a result, a successful market timer is said to choose a high up market beta and a low down market beta. Henriksson and Merton (1981) proposed the following regression equation using a dummy variable to formally express such a relationship:

$$R_{it} - R_{ft} = \alpha_{it} + \beta_{it}(R_{mt} - R_{ft}) + \gamma_{it}[D(R_{mt} - R_{ft})] + \varepsilon_{it} \text{ ---------- 2}$$

In the equation (2) D is the dummy variable having a value of 1, if the market return is equal to or higher than the risk free return (up market), or 0 otherwise

(down market). If the gamma coefficient, γ is positive and statistically significant in both equation 1 and 2, the fund managers possess market timing abilities. The positive and significant alpha, α coefficients in the two equations above imply that fund managers have stock selecting abilities.

In this study, we further evaluate the time series characteristics of the data, departing from the traditional stock selection and market timing models. Our analysis shows that the variables we utilize have a significant time-varying and clustering characteristics. Additionally, the series distribution exhibits leptokurtosis with significant GARCH and ARCH effects. The TM and HM models are therefore extended by accounting for the impact of Auto-Regressive Conditional Heteroscedasticity (ARCH) in the variables. We use the Generalized Auto-Regressive Conditional Heteroscedasticity (GARCH) model proposed by Bollerslev (1986). The time-varying conditional volatility is a function of its own past lag one term plus the past innovations, according to this model. The GARCH (1, 1) model is specified as,

$$R_i - R_f = \alpha + \beta\left(R_m - R_f\right)t + \gamma\left(R_m - R_f\right)^2 + \varepsilon_{pt}, \varepsilon_{pt}|\varphi_{t-1} \sim N(0, \sigma^2) \ldots\ldots\ldots (3)$$

$$R_i - R_f = \alpha + \beta\left(R_m - R_f\right)t + \gamma\left[D\left(R_m - R_f\right)t\right] + \varepsilon_{pt}, \varepsilon_{pt}|\varphi_{t-1} \sim N(0, \sigma^2) \ldots\ldots\ldots (4)$$

$$\sigma_t^2 = \omega + b\varepsilon_{t-1}^2 + g\sigma_{t-1}^2 \ldots\ldots\ldots (5)$$

Equation 3 and 4 are the mean equations and 5 is the variance equation.

The daily data which are screened, arranged and processed are analysed using Treynor-Mazuy and Henrikkson-Merton model and further with the corrected ARCH/GARCH model for portfolio attribution. The model is interpreted based on their statistical significance. The study compares mutual fund daily returns to the market returns, BSE SENSEX and risk free rate, 91 days Treasury bills (which are collected from data library for Indian market). It examines whether mutual fund managers add value in the long run to outperform the market consistently. The performance of the open-ended mutual fund schemes in the volatile market and also the capability of the managers to identify the undervalued or overvalued funds

correctly in order to ensure higher returns is evaluated. The objective of the study to measure performance and to examine the stock selection skills and market timing abilities of fund managers is appropriately measured using the two models. It is assumed that positive alpha under TM model and HM model provides the investors higher rate of return and statistically significant alpha provides abnormal return, which is regarded as the superior stock selection performance of the fund managers. Similarly, positive and statistically significant gamma under TM model and HM model is regarded as the superior performance with market timing abilities among the fund managers. The stock selection and market timing performances of various categories under the equity mutual fund schemes are presented in various tables. A regression analysis is performed for each fund to determine its alpha and gamma coefficients. The analysis is further conducted using ARCH and GARCH model to give us accurate results for the study.

Holdings based analysis is done to check the fund movement among various sectors over the sample period. Sector investing or the sector holdings is a significant factor in influencing investments in the fund. It shows the degree of concentration of fund's assets and diversification of a portfolio. A fund may invest among sectors or target some specific sectors based on their investment objective. The funds are selected based on the highest AUM from top five AMCs and their returns are calculated. The changes in top five sectors and top five company holdings of selected funds are studied and their trend analysis is depicted. An equity fund portfolio displays the stocks where the fund is invested and the percentage of AUM invested in each sectors. The study analysed the variation of fund movement within the sectors and between the sectors during the period 2012-2020 for eight years with data of 108 months. It examined the significant difference of the changes in the sector holdings over the period using ANOVA. The analysis led to the following findings.

9.FINDINGS OF THE STUDY

A total of 1255 equity mutual funds are considered for this study whose data is collected from their inception. The conventional models of stock selection and

market timing i.e. Treynor and Mazuy (1966) and Henriksson and Merton (1981) are applied.There are numerous studies which has extensively addressed the issues of market timing skills and stock selection abilities of fund managers using TM and HM model. Yuxing Yan (1999) employed the autoregressive conditional heteroscedasticity (ARCH) effect on the Treynor-Mazuy model, to test whether the portfolio variance has a significant impact on the TM index. The study revealed the assumption of constant variance is not correctly specified. Therefore, he accounts for heteroscedasticity to TM model to evaluate the performance of mutual funds. Using univariate ARCH (1) to TM model, he found different α (selection ability) and γ (timing ability) when compared with the conventional TM model. Deviating from other studies, we applied the GARCH framework after thorough checking of the ARCH effect in the time series data. Thus, our study has corrected the TM model and HM model with GARCH(1,1) to evaluate the performance of mutual funds.

- The TM Model and the HM Model provides contradictory results in terms of stock selection abilities and market timing abilities. HM model has more positive and significant number of schemes than TM model. HM model have shown positive performance for 904 schemes but TM model has only 492 schemes with superior stock selection skills. According to the TM model, only sixteen percent of Indian fund managers participate in stock selection activities. However, when the GARCH framework is applied to the TM model, nearly 43 percent of the fund managers demonstrate superior stock selection ability. This result is unique and provides scope for the debate on model superiority. As suggested by Agarwal and Pradhan (2018), it is always recommended to confirm the results with the help of multiple well established models. The alpha coefficient of the HM model is positive and statistically significant for 904 funds out of 1255 mutual fund schemes.As per the HM model, nearly 72 percent of the schemes are exhibiting stock selection ability, which is superior to the TM results. It is a clear indication of superior stock picking ability among Indian mutual fund managers. The results are consistent with GARCH framework applied to TM model and HM model. The GARCH results have shown better stock selection abilities when compared to the conventional TM and HM models. Further, all four models demonstrate

that the majority of mutual fund schemes do not have positive and statistically significant gamma values, which indicate the absence of market timing ability among fund managers.The study also shows categorywise analysis of equity funds, agewise performance, AMC wise performance of the funds and performance analysis based on the panels framed according to the number of funds owned by the AMCs.

- The sector holdings analysis analysed the major holdings of the mutual funds where the fund allots majority of the sector weights. Based on the Asset Under Management(AUMs), the Asset Management Companies(AMCs) which holds the top five position are taken for the study. The funds with the highest AUMs under the top AMCs are considered for their holding based analysis. These five AMCs have more than 57 percent of the mutual fund industry. Majority of the sectors have positively grown in the period of five years.The funds on an average have moved at a high rate in around 33 sectors. Healthcare services shows highest growth among all the sectors with a growth rate of around four thousand times in its AUM in a span of five years. Four sectors such as Engineering,Trading, Media and entertainment and hardware have shown a decline in their holdings from 2016 to 2020. However among the top funds, Banking sector acts as the key drivers influencing the mutual fund industry especially in the equity segment. Banks holds a first place in weight assignment of around 17 percent. Trend analysis shows that the banking sector is been positively allocated over the period of nine years by the mutual fund schemes. Software industry also acts as a major contributor to our Indian economy. Trend analysis shows that the software sector is been positively allocated over the period of nine years by the mutual fund schemes. It shows an average growth rate of 9 percent (CAGR i.e.,compound annual growth rate of 32 percent for nine years). Finance sector has shown a positive trend over the period of nine years with an average growth rate of 8 percent. The exposure to oil and gas sector has been increased over the years with a weightage of 2 percent assigned in 2020. However, the growth in this sector is very slow with a compounded annual growth rate of only ten percent. Pharmaceutical sector is assigned fifth place in the mutual fund industry allocation. The growth trend is positive throughout the period of nine years

without much volatility. It is with an average growth rate of 7 percent (CAGR i.e.,compound annual growth rate of 26.75 percent for nine years). The other sectors were also, on an average, able to show positive growth over the study period. The frequency of changes in the allocated weights have been determined, which will also play a major role in performance of mutual funds. The changes in top five holdings in the last five years from 2016 to 2020 is depicted along with percentage increase in their holdings. This helps us to know the company wise investments in major mutual funds.

- The top funds(based on highest AUM among all funds in top AMCs) which are chosen for the study to analyse the trend are -

1. SBI Bluechip fund is a large cap fund with the highest allocation in financial services industry.
2. HDFC Flexi Cap fund with highest share in Banking industry.
3. ICICI Bluechip Fund is a large cap fund with the highest share in Banks and Software industry
4. ABSL Frontline Equity Fund is a large cap fund with major share in Banking industry.
5. Kotak Standard Multi Cap Fund with major share in banks.

All the five funds, on an average have shown a positive trend during the study period but there is fluctuations in major sectors and companies where the funds have invested. Thus, the study examined the relationship between the thirty seven sectors for one hundred and eight months from January 2012 to December 2020 using a statistical tool, ANOVA to answer the research question : There is no significant effect of change in sector holdings among the asset class of mutual funds over the time period.

The results of ANOVA found a statistically significant difference between the means of the sectors and also within the sectors for the period of twelve years using the monthly data from 2012 to 2020 covering 108 months. Banks,

Consumer Non durables, Fertilizers, Petroleum products, Pharmaceuticals and Software are the sectors with higher changes in their holdings over the period. The results indicated that there existed a statistically significant relationship with strong effect size between the sectors. It means changes in the sector have led to better performance. The analysis within the sectors and between the sectors have highlighted that most of the industries are showing upward trend in their fund movement in the period of eight years.

10.SUGGESTIONS AND RECOMMENDATIONS

As the stock selection ability is found in most of the funds, this study is useful for institutional and also individual investors in selecting equity mutual funds. Fund managers have failed to adjust the portfolio risk according to the changing market. So, it is suggested to the investors to be well acquainted about their investment details as it is not advisable to be totally depending on fund managers. Though equity oriented schemes are dominating, the debt oriented schemes are also gaining more importance and hence can be an target area for further research in near future. As the investors frequently change their attitude and preferences, the fund houses need to keep a track on the behaviour of investors and their expectations in order to make better investment decisions. This can also be a major attribute for evaluating fund performance. Our study shows that fund managers do better stock selection but fail to time the market which will hinder the fund's performance. There is a scope for improvement in performance evaluation of mutual fund by using various other multi-criteria decision models.

11.SCOPE FOR FURTHER RESEARCH

The study is focused solely on equity oriented funds and the analysis can be projected towards other categories of mutual funds. There are various models under the evaluation techniques. The study is limited on those models and there is a scope for the development of research with other conditional models especially in India. The advanced analysis using financial econometrics needs to be highlighted as most of the

studies in the Indian scenario are still using the traditional models which involve potential bias.

12. RESEARCH IMPLICATIONS

While analyzing a mutual fund's portfolio, many factors are involved. The sector weights of a fund and their movement over the period of time and also the manager's attributions to performance are the measures used in this study. This will help an investor understand the historical performance and also its growth within a portfolio. It will in help in better investment decisions. The study also breaks down the funds based on equity categories to examine whether the manager has stock picking and timing skills with certain characteristics. The study gives a valuable insight to the investor about the manager's skills and decide on a better mix of good allocators and stock pickers to construct an optimal portfolio.

13. CONCLUSION

Mutual fund investments in emerging markets like India has developed substantially in the past few years. But the studies related to fund performance have been conducted using conventional measures, survey of small period or examination of a small number of funds. Therefore, this study analyses mutual fund performance in India in depth, using survivorship bias free data from inception till 2020, which is the said to be the extensive period in mutual fund performance studies in India. This chapter mainly examines mutual fund performance under various equity diversified categories. A total of 1255 equity mutual funds are considered for this study. The study has examined the market timing and stock selection ability of Indian mutual fund managers. The conventional models of stock selection and market timing i.e. Treynor and Mazuy (1966) and Henriksson and Merton (1981) are applied. Deviating from other studies, we applied the GARCH framework after thorough checking of the ARCH effect in the time series data. The TM Model and the HM Model provide contradictory results in terms of stock selection abilities and market timing abilities. The fund managers demonstrate superior stock selection ability but do not exhibit market timing skills. Therefore, it is difficult to conclude whether Indian fund

managers possess the combination of both skills of selection and timing abilities for better performance.

The performance drivers stock selection, market timing and sector allocation have been reflected in this study. It shows that the Indian mutual fund industry is moving towards the growth in their performance and skills with respect to stock selection and sector allocation. With 72.5 percent positive significant alpha values under the HM GARCH model, the fund managers have shown better stock selection skills among 1255 schemes. But, they showed only 0.3 percent statistically significant positive gamma values and failed to exhibit market timing skills among all the four models. Therefore, It can be concluded that the Indian fund managers possess better stock selection skills but failed to show better market timing abilities.

Holdings based analysis is performed to study the growth rate and trend in the company holdings and sector holdings. The holdings based analysis of the top funds based on AUM is measured. It assesses the trend in top five sector allocation of mutual funds with CAGR, fund wise sector holdings, asset allocation and top company holdings and their changes in five years. The average growth of all the sectors from 2012 to 2020 is depicted. The top five allocation of the top five asset management companies are examined, especially those funds which contribute maximum in terms of AUM. The study showed the trend in top five sector holdings of mutual funds. The fund holdings of top five AMCs and their performance are assessed to check if their changes in holdings have an impact on performance.The movement in holdings of companies and sectors of four out of five funds are positively correlated with the returns during 2016 and 2020. It examined the change in holdings and their impact on fund performance. The statistical significance of changes in holdings of all the thirty seven sectors is analysed and found that there is strong relationship between the holdings during the study period. Banks, Consumer Non durables, Fertilizers, Petroleum products, Pharmaceuticals and Software are the sectors which change their holdings frequently over the period.

This study will be useful for institutional and also individual investors in selecting equity mutual funds for better investment decisions. Our study shows that fund

managers do possess better stock selection but fail to time the market which will hinder the fund's performance. There is a scope for improvement in performance evaluation of mutual funds by using various other multi-criteria decision models.

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